


HomePlug power-line communication


All about HomePlug power-line communication

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What do the different LEDs on the HomePlug adapter mean?

EG4xxx and EG30xx meters can function with a wide variety of HomePlug AV compliant powerline communication adapters. Some officially supported adapters and their LED keys are shown below.

TRENDnet HomePlug AV (TPL-406E2K)			
			
LED	Function	Typical Behavior	Other Behavior
POWER	Indicates the adapter has power	Green light	No LED - no communication for too long or not receiving power
ETHERNET	Indicates an Ethernet line connection	On - live Ethernet line connected Blinking - sending/receiving Ethernet data	Off - may indicate an issue with network connectivity or a damaged Ethernet cable
DATA	Indicates presence of powerline communication	On - Powerline device connected Blinking - sending/receiving powerline data	Off - no connection to any HomePlug devices

TP-Link HomePlug AV (TL-PA2010)			
			
LED	Function	Typical Behavior	Other Behavior
Top	Indicates the adapter has power	Green light	No LED - no Ethernet communication for too long or not receiving power

Middle	not found or type unknown	Indicates a connection with the eGauge or another HomePlug AV adapter	Blinking green when communicating with the eGauge	Off - no connection to any HomePlug AV devices
Bottom	not found or type unknown	Indicates an Ethernet line connection	Blinking green light when transmitting data	Off - may indicate an issue with network connectivity or a damaged Ethernet cable

Actiontec HomePlug AV (PWR500/PWR200)

HomePlug AV Adapter			
LED	Function	Typical Behavior	Other Behavior
PWR	Indicates the adapter has power	Green light	No LED - no Ethernet communication for too long or not receiving power
LK	Indicates a connection with the eGauge or another HomePlug AV adapter	Blinking red light when communicating with the eGauge	Blinking orange or green - possible connection with another HomePlug AV device Off - no connection to any HomePlug AV devices
ETH	Indicates an Ethernet line connection	Blinking green light when transmitting data	Off - may indicate an issue with network connectivity or a damaged Ethernet cable

HomePlug 1.0 HPE100T

HomePlug 1.0 Adapter			
LED	Function	Typical Behavior	
Power	Adapter has power and is connected to the eGauge or another HomePlug 1.0 device	Green light when active, blinking green light when transmitting data	Off - adapter is not receiving power, or cannot communicate to the eGauge

Link	Indicates an Ethernet line connection	Green when active, blinking green when transmitting data	Off - issue with network connectivity or a damaged Ethernet cable
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NOTE: Other HomePlug adapters from different manufacturers may work. However, since they have not been tested by eGauge we cannot guarantee full functionality. Troubleshooting and support may be limited in these situations. HomePlug 1.0 adapters are no longer available directly through eGauge - please see our article on [locating replacement HomePlug 1.0 adapters](#) for more information.

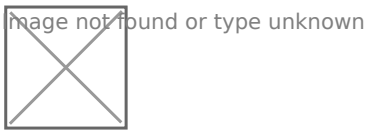
Can the HomePlug adapter be connected to a power strip?

HomePlug adapters should be connected directly into a wall outlet. If that is not an option, it is possible to plug the HomePlug into a power strip provided the power strip has **no integrated surge suppressor**. Most power strips designed for computers have integrated surge suppressors, so they are not suitable. Uninterruptible power supplies or power strips connected to uninterruptible power supplies are also not suitable.

Low-cost power strips are available at local hardware stores and generally work fine. Non-surge suppressed power strips may be referred to as "relocatable power taps". "Multi outlet taps" are also generally suitable. Extension cords may be used, but keep in mind that the length of the extension cord must be factored into the distance between the eGauge and HomePlug (40ft of wire run + 25ft of extension cord = 65ft between the eGauge and HomePlug). Maximum effective communication distance is approximately 100ft.

HomePlug Security Considerations

Overview



Some eGauge models have integrated powerline communication, commonly known as "HomePlug communication" or just "HomePlug". These eGauge models inject a signal into the conductor connected to the L1 terminal of the eGauge and attempt to communicate with other powerline communication devices that are within range connected to the same power line using the HomePlug standard. This effectively acts as a powerline-Ethernet bridge when used to connect an eGauge to a network with a HomePlug adapter.

eGauge2 model units utilize the "HomePlug 1.0" protocol, while newer model eGauges (EG31xx, EG41xx) utilize the newer "HomePlug AV" protocol. "HomePlug AV" is not backwards compatible with "HomePlug 1.0", and the devices will not see each other or communicate. The HomePlug 1.0 standard is no longer in common use, and HomePlug 1.0 adapters [may not be readily available](#).

The HomePlug signal's reach is limited to about 100ft of wiring and does not extend beyond transformers or cross phases. Thus, for most single-family homes, the HomePlug signal will be contained to within the home itself. This is in contrast to a WiFi signal, for example, which usually can be picked up easily outside a home.

Security Considerations

All HomePlug devices have a "password" or "encryption key" assigned to them. Any HomePlug devices with the same encryption key can communicate to each-other and form a "HomePlug network". By default, the HomePlug 1.0 encryption key is "HomePlug" (case sensitive, without quotes) while the HomePlug AV default encryption key is "HomePlugAV" (case sensitive, without quotes).

Because the HomePlug devices come with default encryption keys, buildings that share electrical services (e.g., possibly duplexes, apartment buildings) may have the HomePlug signal extended into neighboring units which could then allow an individual to obtain someone else's network access via a HomePlug adapter if both are using the default encryption keys. Therefore, it is important to set a unique encryption key on any HomePlug networks that may share a power line with another unit.

HomePlug AV (models EG31xx, EG41xx) utilize the HomePlug Green PHY specification and are compatible with HomePlug AV using 128-bit AES encryption.

HomePlug 1.0 (model eGauge2) utilize a HomePlug 1.0-compatible link and are encrypted with 56-bit Data Encryption Standard (DES).

It is best practice to utilize a unique and secure HomePlug encryption password, but in many private residences it is unlikely to be an issue because of the limitations of powerline communication (specifically, it is unlikely the HomePlug signal will propagate beyond the building's electrical wiring).

More information can be found on the HomePlug Alliance website at <http://www.homeplug.org/>.

Related Articles

[Pairing an eGauge with a HomePlug adapter](#)

[What do the different LEDs on the HomePlug adapter mean?](#)

[What are some common causes of HomePlug communication issues?](#)

How do I pair the eGauge with a HomePlug adapter?

Overview

By default all HomePlug-compliant PLC devices use the same encryption key - this means that, out of the box, any HomePlug-compliant device should be able to connect to any other HomePlug-compliant device without any adjustments. However, if there are multiple HomePlug adapters in the same location, or if there are security concerns regarding PLC traffic, it may be necessary to pair an eGauge with its HomePlug adapter. This is typically not required for most installations.

This article has instructions for pairing eGauge devices with their respective HomePlug adapters. Also included are instructions to rescue an "orphaned" device (that is, an eGauge or HomePlug with an unknown encryption key). These steps typically **cannot** be performed remotely, and require physical access to both the eGauge meter and the HomePlug.

In new installations, pairing is optional but not required. The eGauge and HomePlug adapter should communicate out of the box. If they do not communicate, there is likely a distance or installation issue; pairing will not correct these issues.

The internal HomePlug MAC address may be different than the MAC address printed on the meter label. For pairing EG4xxx meters, use a MAC address one higher than the one printed on the label. The MAC address on the label is what the LAN will see; the "internal" address that is one higher is used on the powerline network.

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HomePlug Basics

What is HomePlug and how is it used?

HomePlug is a Power Line Communications (PLC) specification used to transmit networking data over standard power lines. Thus, all HomePlug devices are PLC devices, but not all PLC devices use HomePlug. It is commonly used to create a network bridge in a location where Wi-Fi can not work or is not convenient. Think of the HomePlug adapter as a "translator" that can convert an Ethernet signal into a form which can be sent over existing power lines, and vice versa. HomePlug adapters may commonly be referred to as "HomePlugs", although this can be confusing.

HomePlug adapters are commonly mistaken for wireless (WiFi) devices. Standard HomePlug adapters have no wireless component. A physical connection to an outlet and a router (via Ethernet) is required.

Typically, one HomePlug adapter is connected to a router with Internet access, and another is placed elsewhere in the building so Ethernet-capable network devices may connect to it. eGauge meters have a built-in HomePlug adapter, so only one HomePlug adapter is required when using an eGauge. Examples of common HomePlug adapters are shown below:



TRENDnet TPL-406E



Figure 2.1:
*Actiontec HomePlug
1.0 (eGauge2)*



Figure 2.2: *Actiontec HomePlug AV
(EG301x)*



Figure 2.3: *TP-Link HomePlug AV
(EG301x)*

Older (legacy) HomePlug adapters. No longer available through eGauge but may be used at older sites.

Technical And Environmental Considerations

Phasing - HomePlug communication travels along the phase connected to L1 of the eGauge. The HomePlug adapter must be plugged into an outlet on the same phase as L1. Connecting the

HomePlug to the wrong phase can cause issues with communication speed and quality.

Signal Deterioration and Loss - HomePlug signals can be filtered out by surge suppressors and noise filters, and will deteriorate as the length of wire between the eGauge unit and HomePlug outlet increases. [This article](#) covers several potential causes for HomePlug communication issues.

Voltage Limitations - The HomePlug AV adapters sold by eGauge Systems LLC are rated for voltages up to 240Vac (50 or 60Hz).

Although it is not recommended, eGauge Systems LLC stocks a powered enclosure kit for 277V/480V services which will step down 277Vac down to 120Vac. The transformer is rated at 25VA , suitable for powering several small devices with a combined load < 25VA. Please see [this page](#) for more information.

Multiple HomePlugs on a Network - A single HomePlug adapter can support up to 16 HomePlug devices (eGauge meters) under ideal conditions. Communication may be affected above that limit.

Issues can arise if there are multiple HomePlug adapters connected to the same network. For example, if two eGauge meters and two HomePlugs are connected to the same network, a network loop may occur. The solution is to pair each meter with a specific HomePlug adapter.

How Secure is HomePlug Communication?

EG4xxx and EG301x models use the HomePlug Green PHY specification and are compatible with devices using the HomePlug AV standard. This standard uses 128-bit AES encryption.

eGauge2 models use the HomePlug 1.0 specification and are compatible with devices using the HomePlug 1.0 standard. This standard uses 56-bit DES encryption.

HomePlug 1.0 compliant adapters are considered obsolete, and are no longer sold directly by eGauge Systems. Replacing eGauge2 meters is recommended. [This article](#) has more information.

The range of a HomePlug signal is usually restricted to a single building. More specifically, most utility transformers will completely filter the HomePlug signal. For this reason, there is little risk of a third party intercepting HomePlug communication. Furthermore, due to the nature of the HomePlug standard, even if the HomePlug signal were detectable it would be exceptionally difficult for a third-party device to interpret the point-to-point traffic between two HomePlug devices. Therefore, for most owners of HomePlug devices, privacy of communication is assured without any further steps.

Even if a neighbor could pick up the HomePlug signal, any traffic other than broadcast traffic is difficult to snoop on because the transmission-characteristics of power-lines is so poor that, in practice, communication between any pair of devices cannot be picked up by a third device. In other words, the worst that could happen in such a scenario is that the neighbor could pick up some broadcast traffic or could use your Internet connection for their own purposes.

For extra security and when using HomePlug devices in an apartment or condo or where multiple residences may be powered by a single transformer, it is possible to set a new encryption key to "pair" HomePlug devices. The default key can be changed under **Settings -> HomePlug** (all models) or by using push-button pairing (some models).

HomePlug 1.0 devices use the default key **HomePlug**

HomePlug AV devices use the default key **HomePlugAV**

Changing the HomePlug Encryption Key (pairing)

All HomePlug AV devices (including the eGauge meter) ship with the same default encryption key, meaning all HomePlug AV devices can pair with one another out of the box. However, it may be desirable to pair a specific eGauge and HomePlug adapter (eg, to prevent network loops or increase security). Once paired, the eGauge and HomePlug will only see one another, and will *not* be able to communicate with other HomePlug AV devices. The method to enter pairing depends on the meter model.

Push Button Method (EG301x meters)

EG301x meters feature push button pairing. With this option, the eGauge and a HomePlug can be paired without network access to the meter.

Physical access to the eGauge meter is required. Depending on the installation, there may be a risk of electric shock.

EG301x meters have a small push button located to the right of the Ethernet port. The push button is recessed behind a small hole. Use a 0.8mm paper clip or similar instrument to access the push button. This push button can be used to initiate join mode, leave mode, or factory reset the meter. The function depends on how long the push button is held down. The timing windows for each function are listed below.

Note that the status LED is used to indicate which function is currently selected; releasing the push button activates that function.

EG301x Push Button Timing

Push Duration	Status LED	Description
0.5 - 3 seconds	rapidly blinks blue/off	Join Mode: eGauge will attempt to pair with an existing HomePlug AV network
13 - 16 seconds	rapidly blinks red/blue	Leave Mode: eGauge will randomize its HomePlug AV key, effectively unpairing the meter
20 - 30 seconds	rapidly blinks red/green	Factory Reset: eGauge restores itself to factory settings

Continuing to hold the push button for longer than 30 seconds will skip all functions without making any changes. Note that the timing window for these functions are very tight. It's crucial to release the push button as soon as the desired color code presents itself.

A factory reset will reset all settings on the meter and result in the loss of any recorded data.

LCD Method (EG41xx meters)

EG41xx meters feature an external LCD and multi-position switch. With this option, the eGauge and a HomePlug can be paired without network access to the meter. No special tools are required.

Physical access to the eGauge meter is required. Depending on the installation, there may be a risk of electric shock.

Using the multi-position switch, navigate to the HomePlug menu. Starting from the default "list of registers" view:

Press the button in once.

Toggle left or right until "Settings" is highlighted. Press the button in once.

Toggle left or right until "HomePlug" is highlighted. Press the button in once.

There are three options of interest under the "HomePlug" menu. Press the button in once to select the appropriate option.

EG41xx HomePlug Menu Options

Option Name	Function
Join Others	Join Mode: eGauge will attempt to pair with an existing HomePlug AV network
Random PW	Leave Mode: eGauge will randomize its HomePlug AV key, effectively unpairing the meter
Default PW	Sets the HomePlug AV key back to the default: HomePlugAV

The full manual on the EG4xxx LCD can be found [here](#).

HomePlug Adapter Push Button Timing

Most HomePlug AV adapters will have a push button which can also be used to enter join mode or leave mode. Note that the timing windows vary across models and manufacturers. The timing windows below are for adapters commonly sold by eGauge Systems; it may be necessary to consult the manufacturer's documentation for other models.

TRENDNet TPL-406E HomePlug AV

Push Duration	LEDs	Description
3 seconds	DATA LED will go off, then turn back on	Join Mode: adapter will attempt to pair with an existing HomePlug AV network
10 seconds	All LEDs will turn off and turn back on	Factory Reset: adapter restores itself to factory settings

Actiontec PWR-500/PWR-200 HomePlug AV

Push Duration	LEDs	Description
0.5 - 3 seconds	All LEDs blink on and off	Join Mode: adapter will attempt to pair with an existing HomePlug AV network
5 - 10 seconds	All LEDs turn off and on, LK LED should remain off	Leave Mode: adapter will randomize its HomePlug AV key, effectively unpairing the adapter

14 seconds	All LEDs turn off and on	Factory Reset: adapter restores itself to factory settings
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TP-Link TL-PA2010 HomePlug AV

Push Duration	LEDs	Description
1 second	Power (top) LED blinks on and off	Join Mode: adapter will attempt to pair with an existing HomePlug AV network
10 - 11 seconds	All LEDs turn off and on, Link LED (middle) should remain off	Leave Mode: adapter will randomize its HomePlug AV key, effectively unpairing the adapter

Push Button Pairing Process

To pair an eGauge with an adapter, follow the steps below. Make sure to use the appropriate steps for your HomePlug model and eGauge model.

1. Verify the HomePlug AV adapter and eGauge meter are powered and within communication range (about 100' of wiring distance, *not* line of sight). The HomePlug AV adapter can be connected to the internet, but this is not required at this time.
2. Enter Leave Mode on the eGauge meter. Use the push [button pairing instructions](#) for EG301x meters and the [LCD pairing instructions](#) for EG41xx meters.
3. Enter Leave Mode on the HomePlug adapter. If using a supported HomePlug adapter, refer to the [push button timing table](#) above. If using an unsupported adapter, refer to the manual for that adapter.
4. Enter Join Mode on the eGauge meter. Use the push [button pairing instructions](#) for EG301x meters and the [LCD pairing instructions](#) for EG41xx meters.
5. Enter Join Mode on the HomePlug adapter. If using a supported HomePlug adapter, refer to the [push button timing table](#) above. If using an unsupported adapter, refer to the manual for that adapter.

The devices will now pair. The pairing process can take 5 - 120 seconds depending on signal strength. When the devices have paired, the LK or link light on the HomePlug adapter will light up. On the EG301x meters, the status LED will turn green (solid green if no internet connection is

available, blinking green if an internet connection is available). On the EG41xx meters, a small house icon will appear in the upper left corner of the LCD screen.

Pairing through the eGauge user interface

If physical access to the eGauge meter is not available, it is also possible to pair the eGauge with a HomePlug through the eGauge user interface. Valid credentials are required for this process, and the eGauge must be within range of the HomePlug adapter (about 100' of wiring distance). This is the only pairing option for older eGauge2 meters.

If desired, it is possible to pair multiple eGauge meters with a single HomePlug adapter using this process.

If a mistake is made during this process, the eGauge may no longer be available online. At this point, the only way to restore connectivity would be to attempt to pair the eGauge and HomePlug using the push button pairing process. For eGauge2 meters, it will be necessary to follow the steps in the "[recovering an orphaned device](#)" section.

To pair devices through the eGauge UI, you will need the Device ID and MAC address for each device (eGauge meter or HomePlug adapter) you wish to pair. To locate the MAC address and Device ID for your eGauge, check the info label on the meter itself.

On the EG301x and eGauge2 meter lines the info label is located on the back of the unit (opposite the front label).

On the EG41xx meter line the info label is located on the side of the unit (opposite the CT ports).

The exact label for the HomePlug adapter will vary depending on the model and manufacturer. For most HomePlug adapters, the label is located on the back of the adapter (same side as the plug). Also note that various HomePlug manufacturers may call the Device ID by different names, including PWD and DEK.

Make a note of this information, then make sure that everything is reinstalled and connected properly.

When pairing through the UI, the HomePlug encryption key will be changed for the eGauge meter used to initiate the configuration process. Once the key is changed, these devices will

only be able to communicate with one another.

UI Pairing Process

1. Connect to the eGauge meter.
2. Navigate to the HomePlug configuration page under **Settings -> HomePlug**
3. A list of devices within range will appear. Find the MAC address which corresponds to the device you wish to pair, and enter the Device ID (or DEK, PWD, etc) for that device.
4. Repeat step 3 for any other devices you wish to pair. Note that the eGauge used for this process will *not* appear in this list, which is normal.
5. Choose a new password (encryption key) for the HomePlug network. Remember the default is **HomePlugAV** - if you use the default key, any HomePlug device will be able to connect to the network.
6. Click "Save" at the bottom of the page and enter your credentials. The pairing process may take up to 30 seconds. If the process was successful, a confirmation message will appear. If the process was unsuccessful, an error message will appear and no changes will be made.

MAC address [?]:	Vendor [?]:	TX [?]:	RX [?]:	Device-Password [?]:
00:0f:b3:3f:	Actiontec	9.0	9.0	ABCD - EFGH - IJKL - MNOP

Manually add MAC address of invisible device:

New encryption password:

☒ Show password in clear text.

An eGauge paired with a single HomePlug adapter. Note the Encryption Key is *not* the factory default

MAC address [?]:	Vendor [?]:	TX [?]:	RX [?]:	Device-Password [?]:
f8:2f:5b:00:	eGauge	9.0	9.0	ABCD - FNOR - DJKL - MNOP
00:0f:b3:3f:da:e5	Actiontec	9.0	9.0	LORE - MIPS - UMDO - LORS

Manually add MAC address of invisible device:

New encryption password:

☒ Show password in clear text.

An eGauge paired with a HomePlug and another eGauge meter. Again, note the non-default Encryption Key.

MAC address [?]:	Vendor [?]:	TX [?]:	RX [?]:	Device-Password [?]:
f8:2f:5b:00:	eGauge	9.0	9.0	<input type="text"/> - <input type="text"/> - <input type="text"/> - <input type="text"/>
00:0f:b3:3f:da:e5	Actiontec	9.0	9.0	ABCD - EFGH - IJKL - MNOP
00:0f:b3:3f:da:25	Actiontec	9.0	9.0	<input type="text"/> - <input type="text"/> - <input type="text"/> - <input type="text"/>

Manually add MAC address of invisible device:

New encryption password:

An eGauge paired with a HomePlug adapter at a location with two HomePlugs and two eGauges, preventing a HomePlug loop.

Recovering an Orphaned Device

It's possible that a device (EG301x or HomePlug adapter) may have an unknown HomePlug encryption key, and no method of reverting to the factory default key. These are referred to as "orphaned" devices, as they can no longer connect to any HomePlug network in their current state. There are two ways to recover orphaned adapters: via the eGauge UI, or via software utilities provided by the HomePlug manufacturer.

Via eGauge UI

It's possible to use the UI pairing process to set the device back to the factory standard HomePlug encryption key. Note that this process can be used for eGauge meters and HomePlug adapters.

This process is only necessary for orphaned EG301x or eGauge2 meters. For orphaned EG41xx meters, simply use the LCD interface to reset the HomePlug password, as outlined [here](#).

To begin, make a note of the MAC address and Device ID (or DEK, PWD, etc) for the orphaned device. Make sure the orphaned device is reinstalled, powered on, and within range (about 100' of wiring distance).

1. Connect to the eGauge meter
2. Navigate to the HomePlug configuration page under **Settings -> HomePlug**
3. A list of devices will appear. Ignore the list for now, and look for the "Manually enter MAC address of invisible device" field.
4. Enter the MAC address of the orphaned device. MAC addresses should be entered without colons (:).
5. Click "Add MAC". A new entry for the orphaned device will appear in the list of devices.
6. In the list of devices, locate the manually-added device (the Vendor column will list it as <manual>). Enter the Device ID (or DEK, PWD, etc) for that device.
7. Choose a new password (encryption key) for the HomePlug network. Remember the default is **HomePlugAV** - if you use the default key, any HomePlug device will be able to connect to the network. This is probably desired when rescuing an orphaned device.
8. Click "Save" at the bottom of the page and enter your credentials. The pairing process may take up to 30 seconds. If the process was successful, a confirmation message will appear. If the process was unsuccessful, an error message will appear and no changes will be made.

MAC address [?]:	Vendor [?]:	TX [?]:	RX [?]:	Device-Password [?]:
00:0f:b3:3f:c3:de	Actiontec	9.0	9.0	<input type="text"/> - <input type="text"/> - <input type="text"/> - <input type="text"/>
22:c0:ff:ee:34:5a	<manual>	n/a	n/a	PRIE - ERRJ - JEAF - NORD

Manually add MAC address of invisible device:

Add MAC

New encryption password:

HomePlugAV

Set Password



Show password in clear text.

Example of an orphaned device recovery in process. Note the Encryption Password is set to the default value.

Via Vendor Software

The software below is not written or maintained by eGauge Systems. No guarantee is made regarding functionality. When using a third party adapter, it may be necessary to obtain the correct software from that adapter's manufacturer.

For HomePlug AV adapters from TP-Link, the software located at the following link may be used. For issues with the software, contact TP-Link directly.

<https://www.tp-link.com/us/support/download/tl-pa2010/#Utility>

What are some causes of HomePlug communication issues?

Note that a combination of the issues below may be involved with any communication problem. Also, there may be factors impacting eGauge/HomePlug communication not presented below.

GFCI Outlets

Almost all GFCI outlets will cause issues, but will not necessarily prevent communication. A standard outlet can be installed; however this may not be allowed by code. GFCI outlets which exist at the head of a chain (closest outlet to the electrical panel) will affect all other outlets on that chain.

AFCI Breakers

Some arc-fault breakers will trip when the HomePlug is connected. As of right now, eGauge Systems has no data on which breaker models have this issue. If you come across a model that causes issues, please contact the support department at support@egauge.net. Note that AFCI issues can be intermittent - for example, the breakers may trip consistently for a period, then not trip for several days, then start tripping again, with no changes to the hardware or site conditions.

Surge Protectors

Outlet-style and strip-style both cause significant issues with HomePlug communication by filtering out the HomePlug signal. More information is available [here](#).

Phase Mixups

The eGauge communicates with the HomePlug over the phase connected to L1. If the HomePlug is installed on the phase connected to L2, it can cause significant communication issues. For more information, refer to the phasing document available [here](#).

Transformers

In almost all cases, transformers will completely filter the HomePlug signal, resulting in a total loss of communication.

Wire Run Length

The effective range of HomePlug communications is approximately 50-100ft. Note that this distance refers to the length of wire in the walls, not a straight line between the eGauge and HomePlug. Longer wire runs will cause communication problems.

Other HomePlug Devices

Depending on the model, the eGauge either uses the HomePlug AV or HomePlug 1.0 communication protocol. Other devices using the same protocol can cause communication issues. Devices using the 1.0 protocol will not interfere with devices using the AV protocol, and vice versa. Pairing the eGauge and HomePlug together can often resolve these issues. Information on pairing the eGauge and HomePlug can be found [here](#).

LED Codes

The color and pattern of the LEDs on the eGauge and HomePlug can help troubleshoot communication issues. A guide to the HomePlug LED codes can be found [here](#). A guide to the eGauge LED codes can be found [here](#) (eGauge2 and EG30xx only). A guide to the EG4xxx LCD can be found [here](#).

Out of Date Firmware

There are certain types of communication issues associated with older firmware versions. Keeping the eGauge firmware up to date is recommended. If you are unsure about the firmware version your device is using, refer to the instructions on checking firmware version located [here](#).

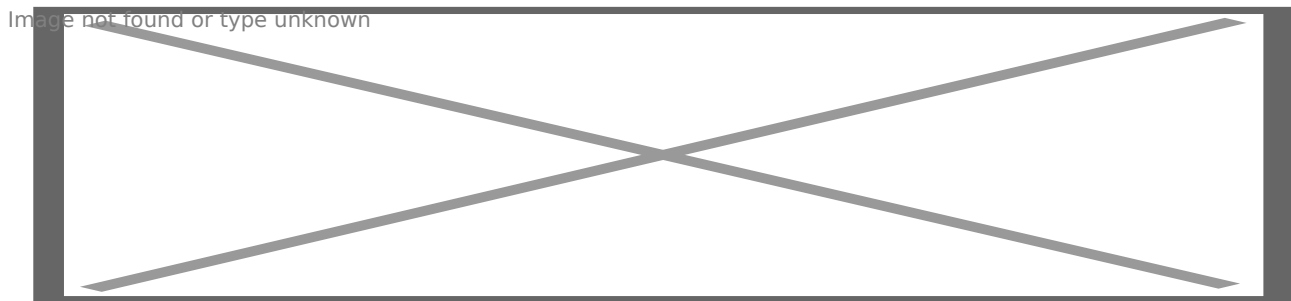
Different Encryption Keys

HomePlug adapters and meters can have a unique encryption key set. If the HomePlug adapter and eGauge meter have different HomePlug encryption keys, they will be unable to communicate. By default all EG4xxx meters and compatible HomePlug AV adapters use the same default encryption key of "HomePlugAV". EG30xx meters also use "HomePlugAV", while legacy eGauge2 model meters use an older, no longer available HomePlug version that uses an encryption key of "HomePlug". See [this article](#) on changing the encryption key and pairing eGauge and HomePlug adapters.

How do I check HomePlug communication speed?

If the eGauge interface can be accessed, it is possible to view the HomePlug communication speed. Navigate to **Settings -> HomePlug** or use this link: <http://DEVNAME>

.egaug.es/settings.html?s=HomePlug (replacing **DEVNAME** with the [device name](#) of your eGauge). This will show the transmission speed (TX) and receiving speed (RX) of any HomePlug devices within range of the eGauge (including other eGauge meters and third party products also using PLC communication). The page refreshes every ten seconds.



Sample HomePlug Communication Speed Readout

Ideally, the HomePlug communication speed should be above 2.0Mbps for both TX and RX. A speed of 9.0Mbps is the upper limit for communication speed. Speeds below 2.0Mbps can result in connectivity issues and timeouts when attempting to view data on the eGauge. Note that the RX speed will show as N/A on older eGauge2 models.

EG41xx meters utilizing the Go Proxy after January 2024 can display this information using:
<https://DEVNAME.egaug.io/settings.html?s=HomePlug>